UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/719,968	11/21/2003	S. Ben Choi	1-24440	3571

46582 7590 11/15/2004

MACMILLAN, SOBANSKI & TODD, LLC
ONE MARITIME PLAZA - FOURTH FLOOR
720 WATER STREET
TOLEDO, OH 43604

EXAMINER	
SUN, XIUQIN	
ART UNIT	**PAPER NUMBER**
2863	

DATE MAILED: 11/15/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/719,968	CHOI, S. BEN	
	Examiner	Art Unit	
	Xiuqin Sun	2863	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 November 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-24* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-12 and 15-22* is/are rejected.

7)☒ Claim(s) *13,14,23 and 24* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *21 November 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *11/21/2003*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bargman et al. (U.S. Pat. No. 6421592) in view of Kimbrough (U.S. Pat. No. 6370467).

Bargman et al. teach a method for estimating a propensity of a vehicle to rollover, the method comprising the steps of: determining lateral kinetic energy of said vehicle in response to vehicle lateral velocity which is dependent on vehicle longitudinal velocity and the coefficient of friction between the soil and the vehicle (col. 3, lines 41-67 and col. 4, lines 1-15 and lines 61-67); measuring a lateral acceleration of said vehicle (col. 3, lines 41-67 and col. 4, lines 1-15); and determining a rollover potentiality index in response to said lateral kinetic energy and said lateral acceleration (col. 4, lines 19-36; col. 5, lines 64 and col. 6, lines 1-19).

Bargman et al. do not explicitly mention that: determining lateral kinetic energy of said vehicle in response to vehicle side slip angle.

Kimbrough teaches an algorithm for determining vehicle lateral velocity from vehicle longitudinal velocity and vehicle side slip angle (col. 4, lines 10-20 and col. 20, lines 37-38).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to include the teaching of Kimbrough in the invention of Bargman et al. in order to determine said lateral kinetic energy from vehicle lateral velocity which is in turn derived algebraically from vehicle longitudinal velocity and vehicle side slip angle (Bargman et al., col. 4, lines 61-67 and Kimbrough, col. 20, 37-38).

3. Claim 2-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bargman et al. (U.S. Pat. No. 6421592) in view of Kimbrough (U.S. Pat. No. 6370467) and Barta et al. (U.S. Pub. No. 20030055549).

Bargman et al. teach a method for estimating a propensity of a vehicle to rollover, the method comprising the steps of: determining lateral kinetic energy of said vehicle in response to vehicle lateral velocity which is dependent on vehicle longitudinal velocity and the coefficient of friction between the soil and the vehicle (col. 3, lines 41-67 and col. 4, lines 1-15 and lines 61-67); measuring a lateral acceleration of said vehicle (col. 3, lines 41-67 and col. 4, lines 1-15); and determining a rollover potentiality index in response to said lateral kinetic energy and said lateral acceleration (col. 4, lines 19-36; col. 5, lines 64 and col. 6, lines 1-19). The teaching of Bargman et al. further includes: said vehicle longitudinal velocity is determined by monitoring wheel speed sensors (col. 4, lines 54-60); said lateral acceleration is determined by monitoring an accelerometer (col. 5, lines 64-67 and col. 6, lines 1-19).

Bargman et al. do not explicitly mention that: determining lateral kinetic energy of said vehicle in response to vehicle side slip angle; determining a rollover index by weighting said rollover potentiality index by a factor of said lateral acceleration; determining if said rollover index is above a predetermined threshold; said vehicle side slip angle is determined by monitoring a yaw rate of said vehicle, a lateral acceleration of said vehicle, a steering wheel angle of said vehicle, and a vehicle dynamic model; said rollover event comprises a condition wherein a corrective action is taken to counteract an actual rollover; a control action for changing at least one operating parameter of said vehicle in response to detecting said rollover event to counteract an actual rollover from occurring; said control action comprises a torque reduction applied to at least one wheel of said vehicle in response to said control action; said torque reduction comprises an actuation of a brake; said torque reduction comprises a change in said engine output; said control action comprises an automated steering adjustment; said control action comprises an automated suspension adjustment.

Kimbrough teaches an algorithm for determining vehicle lateral velocity from vehicle longitudinal velocity and vehicle side slip angle (col. 4, lines 10-20 and col. 20, lines 37-38). Kimbrough also teaches: said vehicle side slip angle is determined by monitoring a yaw rate of said vehicle, a lateral acceleration of said vehicle, a steering wheel angle of said vehicle, and a vehicle dynamic model (col. 20, lines 24-43).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to include the teaching of Kimbrough in the invention of Bargman et al. in order to determine said lateral kinetic energy from vehicle lateral velocity which is

in turn derived algebraically from vehicle longitudinal velocity and vehicle side slip angle (Bargman et al., col. 4, lines 61-67 and Kimbrough, col. 20, 37-38).

Barta et al. teach a method for determining likelihood of rollover of a vehicle using rollover index, including the steps of: determining a rollover index by weighting said rollover potentiality index by a factor of said lateral acceleration (section 0075, lines 18-24; sections 0100-0103 and claim 1); and determining if said rollover index is above a predetermined threshold (sections 0006-0007, 0107-0108, 0121 and claim 1). The teaching of Barta et al. further includes: a corrective action is taken to counteract an actual rollover (sections 0122-0124); a control action for changing at least one operating parameter of said vehicle in response to detecting said rollover event to counteract an actual rollover from occurring (sections 0122-0126 and 0132-0141); said control action comprises a torque reduction applied to at least one wheel of said vehicle in response to said control action and said torque reduction comprises an actuation of a brake (sections 0132-0141); said torque reduction comprises a change in said engine output (sections 0132-0141); said control action comprises an automated steering adjustment (sections 0132-0141); said control action comprises an automated suspension adjustment (sections 0122-0126).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to include the teaching of Barta et al. in the invention of Bargman et al. in order to provide an algorithm to produce improved values for estimating the likelihood of vehicle rollover and further provide mechanism of rollover mitigating controls (Barta et al., Abstract).

4. Claim 15-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barta et al. (U.S. Pub. No. 20030055549) in view of Kimbrough (U.S. Pat. No. 6370467) and Bargman et al. (U.S. Pat. No. 6421592).

Barta et al. teach a system for determining likelihood of rollover of a vehicle using rollover index, including: a lateral acceleration sensor (section 0070); a controller for determining a rollover potentiality index in response to weighting said rollover potentiality index by a factor of a measured lateral acceleration for determining a rollover index (section 0075, lines 18-24; sections 0100-0103 and claim 1). The teaching of Barta et al. further includes: a control action for changing at least one operating parameter of said vehicle in response to detecting said rollover to prevent an actual rollover from occurring (sections 0122-0126 and 0132-0141); said at least one operating parameter comprises a torque reduction of said engine output (sections 0132-0141); said at least one operating parameter comprises a torque reduction of at least one wheel (sections 0132-0141); said torque reduction comprises an actuation of a brake (sections 0132-0141); and an automated steering adjustment system for adjusting said at least one operating parameter (sections 0132-0141).

Barta et al. do not mention explicitly: at least one wheel sensor for measuring the vehicle longitudinal velocity; a yaw rate sensor; a steering wheel sensor; a vehicle specific dynamic model; a control for determining a side slip angle; a lateral acceleration sensor comprises an accelerometer.

Kimbrough teaches an algorithm for determining a vehicle side slip angle by monitoring a yaw rate of said vehicle, a lateral acceleration of said vehicle, a steering

wheel angle of said vehicle, and a vehicle dynamic model (col. 20, lines 24-43). The teaching of Kimbrough further includes: a lateral acceleration sensor comprises an accelerometer (col. 20, lines 19-23).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to include the teaching of Kimbrough in the invention of Barta et al. in order to determine likelihood of rollover of a vehicle in response to a lateral velocity and in turn a side slip angle of said vehicle (Bargman et al., col. 4, lines 61-67 and Kimbrough, col. 20, 37-38).

Allowable Subject Matter

5. Claims 13, 14, 23 and 24 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Reasons for Allowance

6. The following is an examiner's statement of reasons for allowance:

The primary reason for the allowance of claims 13 and 23 is the inclusion of the limitation that said rollover potentiality index is represented by the formula:

$$\Phi_0 = \frac{1}{2}|V_x \beta|^2 - \sqrt{g^2 + a_{ym}^2}\sqrt{d^2 + h^2} + d a_{ym} + h g ,$$

where Vx is said vehicle longitudinal velocity, ß is said vehicle side slip angle, g is a gravity constant, a_{ym} is said measured lateral acceleration, d is one half a vehicle track width, and h is a nominal center of gravity height. It is this limitation found in each of the

claim, as it is claimed in the combination that has not been found, taught or suggested by the prior art of record, which makes these claims allowable over the prior art.

The primary reason for the allowance of claims 14 and 24 is the inclusion of the limitation that said rollover potentiality index is represented by the formula:

$$\Phi = \Phi_0 \times (a_{y\max} - \frac{d}{h} g \times 0.8 > 0).$$

It is this limitation found in each of the claims, as it is claimed in the combination that has not been found, taught or suggested by the prior art of record, which makes these claims allowable over the prior art.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Contact Information

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Xiuqin Sun whose telephone number is (571)272-2280. The examiner can normally be reached on 6:30am-4:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Barlow can be reached on (571)272-2269. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Xiuqin Sun
Examiner
Art Unit 2863

XS
November 10, 2004

John Barlow
Supervisory Patent Examiner
Technology Center 2800